BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 180 207**
A2

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: 85113772.9

(22) Date of filing: 29.10.85

(51) Int. Cl.⁴: A 22 C 13/00

(30) Priority: 30.10.84 US 666457

(43) Date of publication of application: 07.05.86 Bulletin 86/19

(84) Designated Contracting States: AT BE CH DE FR GB IT LI LU NL SE

(71) Applicant: UNION CARBIDE CORPORATION, 39 Old Ridgebury Road, Danbury Connecticut 06817 (US)

(72) Inventor: Schutt, Greta Rosa, 4723 North Kewanee, Chicago Illinois 60630 (US)
Inventor: Stall, Alan David, 2023 Bristol Court, Naperville Illinois 60565 (US)

(74) Representative: Eggert, Hans-Gunther, Dr., Räderscheidtstrasse 1, D-5000 Köln 41 (DE)

(54) **Cellulosic food casings.**

(57) Cellulosic casings being easily peelable from food products encased and processed therein are provided with a release coating comprising an admixture of an anionic water-soluble cellulose ether, a nonionic water-soluble cellulos ether, and a lubricant. When shirred into compact casing sticks, the sticks have enhanced coherency and are easily deshirred.

EP 0 180 207 A2

CELLULOSIC FOOD CASINGS

Field of the Invention

The present invention relates generally to peelable food casings and, more particularly, to such casings in the form of highly coherent, readily deshirrable shirred [illegible] together with a method of manufacture thereof.

Background [illegible] Invention

[illegible]ood casings us[illegible] [illegible]he processed food [illegible]ndu[illegible] [illegible]e generally thi[illegible] [illegible]ed tubing of various diame[illegible] [illegible]epared from rege[illegible] [illegible]d cellulose, cellul[illegible] [illegible]erivatives, alginates, collagen and the like. Fibrous webs may also be embedded in these food casings and such casings are commonly termed in the art "fibrous food casings". In general, both fibrous and non-fibrous casings have multifunctional uses in that they may be employed as containers during the processing of the food product encased therein and also serve as a protective wrapping for the finished product. In the sausage meat industry, however, the preparation of various types of sausages ranging in size from smaller sausages, such as frankfurters, up to the larger sizes, such as bolognas, usually involves removing the casing from the processed meat prior to final packaging. Peeling the casing from the processed sausage has presented major problems, particularly in the production of frankfurters where large numbers of the product are involved and the desire in commercial op rations is to use high-speed, automatic stuffing and peeling machines.

When the casing is removed from the meat mass, there is occasionally a tendency for some meat to adhere to the casing and be torn from the sausage with the casing, thereby causing surface marring of the sausage. In other instances, variations in the meat emulsion formulations or in the processing conditions can result in a degree of adherence of the casing to the product which hinders rapid removal of the casing from the product encased therein. The use of high speed, automatic peeling machines in commercial operations as, for example, disclosed in U.S. Patent No. 2,424,346 to Wilcoxon; 2,514,660 to McClure et al.; 2,686,927 to Greg; and 2,757,409 to Parkers et al., makes it particularly essential that there be minimal resistance to the separation of casing from sausage, or the product will jam at the peeler or go through unpeeled. Less than complete removal of the casing necessitates th expense of hand sorting and peeling.

Heretofore many attempts have been made to provide casings having easy release characteristics. It is known in the art, as disclosed, for example, in U.S. Patent No. 2,901,358 to Underwood et al.; 3,106,471 and 3,158,492 to Firth; 3,307,956 to Chiu et al.; 3,442,663 to Turbak; 3,558,331 to Tarika; and 3,898,348 to Chiu et al., that the application of certain types of coatings to the inside wall of food casings may afford improvement in the release characteristics of the casing from the encased sausage product.

Food casings having good rel as characteristics sometimes present oth r problems,

unrelated to the release property, prior to, or at the time of, the automatic food stuffing operation. Casings which are generally utilized to encase food product such as vienna sausage, frankfurters and the like, are ically fabricated in continuous lengths, measuring from about 55 feet to 160 feet or l in length, and from about 7/8 inches to 2-1/2 i more in flat width, which are formed into shi sticks. The casing is stored, prior to use, form of these shirred or pleated casing sticks measuring 1 to 2 feet in length.

Two properties of the shirred casing sticks are particularly important, namely the "coherency" of the stick, which relates to the stick's capacity to maintain its integrity as a shirred stick and not to "break" into multiple shirred pieces, and the "ease of deshirring" of the stick, which relates to the ability to depleat the shirred stick just prior to stuffing without applying excessive force that would cause the casing to tear. It has been found that some release coatings as, for example, disclosed in U.S. Patent No. 3,451,827 to Bridgeford, when applied to the inside surface of the food casing, interfere with mechanical shirring of the casing or the mechanical stuffing of shirred casing. Other release coatings, such as those disclosed in U.S. Patent 3,898,348 to Chiu et al, while providing excellent release properties, at times leave something to be desired in terms of shirred stick coherency. Other considerations in providing food casings having asy release charact ristics includ providing a coating

composition which is stable and suitable for the preparation of shirr d casing sticks.

Typical methods and apparatus employed in the shirring of lengths of tubular casing to obtain shirred casing sticks are disclosed, for example, in U.S. Patent 2,984,574 to Matecki and U.S. Patent 3,110,058 to Marbach. It is also known to apply an aqueous coating composition to the internal surface of the casing through a hollow mandrel over which the casing is advancing as, for example, as described in U.S. Patent 3,451,827 to Bridgeford. In order to prevent damage to the casing while it is being shirred, it has been the practice to provide a lubricant to the shirring mandrel such as mineral oil employed with the coating composition.

Accordingly, it has been found desirable to employ a stable coating composition which provides release properties, lubricating properties, and which also enables depleating of shirred casing sticks without undue breakage during stuffing. Because of the need for providing the foregoing desirable characteristics, as well as the need of providing a coating composition which is stable and which will not separate, it has previously been found necessary to employ an emulsifier such as the polyoxyethylene sorbitan ester of higher fatty acids as taught by Chiu et al in U.S. Patent 3,898,348. Therefore, there is a continuing need to provide new and improved coating compositions for shirred food casings having the aforementioned desirable properties.

Summary of the Invention

In one aspect, the present invention relates to tubular cellulosic food casings having a coating over the internal surface thereof, the coating composition comprising a mixture of a first component comprising an anionic water-soluble cellulose ether, a second component comprising a nonionic water-soluble cellulose ether, and a third component comprising a lubricant.

In another aspect, the present invention relates to shirred tubular cellulosic food casings coated with the aforementioned coating composition.

In a further aspect, this invention relates to a method of preparing coated tubular cellulosic food casings which comprises applying to said food casings a coating comprising at least the aforementioned three components.

In still a further aspect, this invention relates to a method of preparing an encased foodstuff which includes the step of stuffing the aforementioned coated casings with food product.

In yet a further aspect, this invention relates to a coating composition containing the aforementioned three components, said coating composition being useful to provide tubular cellulosic food casings which are easily peeled from the food product encased and processed therein.

Detailed Description of the Invention

In accordance with this invention, there are provided cellulosic food casings having a coating over the int rnal surfac ther of, said coating comprising an admixtur of an anionic

water-soluble cellulose ether, a nonionic water-solubl c llulose ether, and a lubricant selected from the group consisting of animal oil, vegetable oil, mineral oil, and silicone oil, acetylated monoglycerides, polyoxyethylene monoesters, sorbitan trioleate, and mixtures thereof. Such cellulosic food casings are easily peeled from foodstuffs encased and processed therein. When shirred, the food casings are highly coherent and are readily deshirrable during a food stuffing operation.

The anionic water-soluble cellulose ether may be selected from the group consisting of carboxymethylcellulose and carboxymethyl hydroxyethylcellulose, and is present in said coating in an amount of from between about 0.01 mg/in^2 and about 0.04 mg/in^2 of casing surface, preferably in an amount of from between about 0.028 mg/in^2 and about 0.035 mg/in^2 of casing surface.

Commercially, carboxymethylcellulose and carboxymethyl hydroxyethylcellulose are almost always sold as the sodium salt, and it is well established trade practice not to refer to the commercial product as the sodium salt. For the purpose of this application, reference to these materials shall mean the sodium salt and other alkali metal salts thereof. Also suitable are the alkali soluble ethers, as, for example alkali soluble methyl cellulose and hydroxyethylcellulose, and for the purpose of this application the definition of water soluble is intended to include such alkali soluble c llulose ethers.

In accordance with this invention, the coating composition may be provided from a solution containing at least about 0.3 percent by weight of the anionic water-soluble cellulose ether, at least about 0.2 percent by weight of the nonionic water-soluble cellulose ether, at least about 1 percent by weight of the lubricant, and the balance being water, all weight percentages being based on the weight of the coating composition.

The nonionic water-soluble cellulose ether may be selected from the group consisting of methyl cellulose, hydroxypropyl methylcellulose, hydroxybutyl methylcellulose, hydroxypropylcellulose, ethyl methyl cellulose, hydroxyethylcellulose, and ethyl hydroxyethylcellulose. The nonionic water-soluble cellulose ether is present in the said coating in an amount of from between about 0.007 mg/in^2 and about 0.15 mg/in^2 of casing surface, and preferably, in an amount of from between about 0.015 mg/in^2 and about 0.035 mg/in^2 of casing surface.

The third component of the coating composition is present in said coating in an amount of from between about 0.035 mg/in^2 and about 0.28 mg/in^2 of casing surface, and preferably, in an amount of from between about 0.07 mg/in^2 and about 0.21 mg/in^2 of casing surface. The third component is preferably mineral oil.

Particularly suitable coating compositions also contain between about 10 percent and 90 percent by weight, based on the weight of the coating composition, of a polyol having from 3 to 6 carbon atoms and at 1 ast

2 hydroxyl groups. Typical polyols that can be employed are glycerol, propylene glycol, triethylene glycol, and sorbitol. The amount of polyol that may be used is, in general, dependent on the desired viscosity of the coating composition and also on the amount of water that may be tolerated by the tubular casings being treated.

Casings produced in accordance with the method of the present invention can be utilized in the preparation of encased foodstuffs from a wide range of food formulations and processing conditions, and then can be readily removed from the processed foodstuff using high-speed, automatic peeling machines without scarring or scuffing the foodstuff surface, and with high peeling efficiency.

The food casings of the present invention may be prepared from tubular casings such as fibrous reinforced regenerated cellulose, and particularly casings of non-fibrous regenerated cellulose, that are fabricated in accordance with any of the known commercial methods, by applying the coating composition of this invention to the internal surface of such casings.

Lengths of food casings are generally shirred or pleated into shirred casing sticks for ease of storage, handling, and subsequent use on automatic food stuffing machines. During use, the shirred casing sticks must be readily extended or deshirred without tearing or other damage when stuffed with a food emulsion, yet the shirred stick must exhibit sufficient cohesive strength or "coher ncy" to be self-sustaining and permit

handling thereof without breaking, and to insure trouble-free operation with manual and automatic food stuffing apparatus.

It has been found, however, that when certain water-soluble ethers are employed for imparting release characteristics to food casings prepared in the form of shirred casing sticks, the pleats of the shirred casing, which are nested together and interlocked, tend to excessively adhere to each other (so-called "blocking of pleats") and the casing subsequently will be damaged during stuffing with meat emulsion.

It has also been found that when certain water-insoluble alkylene oxide adducts of fatty acids or fatty acid partial esters are employed to impart release characteristics to food casings, the solution stability of the coating composition is much less than desirable. That is, it is highly desirable for production purposes that the coating composition provide a stable solution for at least seventy-two hours, such as over a week-end period, in order to avoid the need to make a fresh coating solution daily, or having to discard the coating solution because it has separated. The coating composition of the instant invention overcomes these noted disadvantages of the coating compositions of the prior art, and it provides improved characteristics to the shirred food casings of this invention.

Generally speaking, the coating composition of this invention may be applied to the internal casing surface by using any ne of well-known

methods. Thus, for example, a coating composition containing the water-soluble cellulose ethers can be introduced into the casing in the form of a "slug" of liquid, and advancing the casing past the liquid slug coats the inner surface thereof. Alternatively, a preferred method is application of an aqueous coating composition to the internal surface of the casing through a hollow mandrel over which the casing is advancing as, for example, the mandrel of a casing shirring machine in a manner similar to that described in U.S. Patent No. 3,451,827 to Bridgeford. However, in the best mode, the coating composition of this invention is applied to the internal casing surface by employing a three-passage shirring mandrel. Such a mandrel has three separate ducts; one duct for supplying inflating and propellant air, one duct for supplying the coating composition, and one duct to relieve pressure for the excess air-coating composition mixture, for example, as disclosed in Steinbis U.S. Patent 4,374,871.

It has been found that aqueous solutions of the coating compositions of this invention are most suitable and preferred for preparation of the coated tubular fibrous and non-fibrous casings of the present invention. These aqueous solutions afford a more uniform coating of the coating composition and better control of the amount of the desired coating applied to the surface of the casing. However, application of a coating composition in suspension form may be satisfactory for preparing casings used for certain applications.

Other factors are known to affect the preparation of shirred casing sticks and the suitability of the shirred casing sticks for use in the processing of various types of food products, particularly when high speed automatic equipment is employed in the shirring and stuffing operations. It is well known in the art, for example, that if the moisture content of the tubular casing is greater than about 40 percent by weight, based upon the weight of dry cellulose, difficulty is experienced d shirring such as shirred stick coherency bein nished, thereby making stuffing operations mor cult. Further, it has been found that when r is applied to the casing during the shirring process, application of excess amounts of water will cause the casing to seize on the shirring mandrel, thus making further processing thereby very difficult, if not impossible.

Reference to the terms "moisture content" or "water content" throughout the specification and claims with respect to the cellulosic casings of the instant invention, unless otherwise specified, is intended to refer to and should be understood as referring to the weight percent of moisture or water in the casing based on the weight of dry cellulose in the casing. Accordingly, the term "dry cellulose" excludes the weight of all other casing components, such as moisture, water, colorants, coating materials such as moisture barrier and peelability coatings, plasticizers, and other mat rials left on the casing after the casing has been heated to drive off all of the water and other volatile mat rials initially present in th casing.

Further, when it is desired to apply the coating compositions described herein, as, for example, while the tubular casing is passing over a shirring mandrel prior to or during the shirring operation, it has been found that the amount of coating composition applied while treating the internal surface of the casing must be controlled to limit the amount of water added to the casing. In accordance with the present invention, the coated casing should have a water content, based upon the weight of dry cellulose, of between about 12.0 weight percent and about 40.0 weight percent, preferably between about 22.5 weight percent and about 34.5 weight percent, and more preferably between about 25.5 weight percent and about 33.0 weight percent, in order to avoid the above mentioned problems while optimizing stick coherency.

It is more particularly advantageous to avoid application of more coating composition than can be imbibed by the casing in order to prevent excess coating composition from being lost and wasted, or from accumulating in localized areas of the shirred sticks with resulting detrimental effects thereto.

Another factor known to be especially important as it affects the suitability of shirred casing sticks for use with automatic food stuffing equipment, as, for example employed in the preparation of products such as frankfurters, is the durability or coherency of the shirred stick as a self-sustaining article. A disjoinder or br ak in the hirr d stick prior to mounting on the stuffing

apparatus makes the stick unsuitable for use. Accordingly, any treatment, such as the application of a coating to a tubular food casing that is to be formed into shirred casing sticks, must not detrimentally affect the coherency of the shirred stick, and the coating material and method of application thereof, must be considered in light of its effect on coherency.

Following is a description of the coherency test that is used in determining this important characteristic of shirred casing sticks.

Coherency Test Method

The coherency of a casing stick is determined by measuring the bending moment in inch-pounds at the breaking point of a stick. A casing stick is cradled on two V-notched support brackets secured on a base plate and spaced apart a distance (D), about 80% to 90% of the length of the casing stick being tested. A pressure member having V-notched struts spaced apart a distance of D less 4 inches is centrally lowered onto the top of the casing stick. A downward pressure is provided by a motor operated rack and pinion linkage to a force gauge (such as a Hunter Force Indicator, Model L-IM with a "Hold at Maximum Device") that is secured centrally to the pressure member. The force is increasingly applied until the casing stick breaks. The force reading P in pounds is noted. The bending moment in inch-pounds at break on the apparatus is equal to P/2 X 2 inches, and thus the force reading P equates to inch-pounds of bending moment required to break the casing stick. In general, a coherency of at

least about 1.0 inch-pound is required for the casing stick to b consider d to have an acceptable coherence, and a coherency of at least about 2.5 inch-pounds or higher is especially suitable and preferred.

Another factor that is important in affecting the suitability of shirred casing sticks for use with automatic food stuffing equipment is the deshirring force required to deshirr the casing. If the required deshirring force is excessive, tearing of casing will result during deshirring. A deshirring force test, as described below, was employed in evaluating the coated casings of the present invention.

Deshirring Force Test

This test was used to determine the force required to deshirr a selected stick of casing in the direction in which it would be stuffed. The apparatus used consists of a force gauge (Model L-1, Ametek Testing Equipment Systems, measuring 0-1 pounds marked off in 0.01 lb. increments) and a pulley with an attached reeling device which is used to pull and deshirr the casing for the shirred stick. Using this equipment, a casing stick is pulled and deshirred at a constant speed of 45 inches per minute.

The test procedure for the deshirring force test consists of the following steps:

(a) From the selected shirred stick, samples of an approximately 2-inch shirred length ar remov d from the op n end, th middl , and the clos d end of the stick.

(b) Th nd of each stick sample is deshirred by hand approximately 1 inch. Tape is wrapped around the cone portion of the stick to ensure that the casing will not deshirr at that cone position.

The deshirred portion of the st k is clam he force gauge using a spring cl nd a str attached to the gauge. The othe of the s is clamped to the reeling device ached to t ulley.

(d) The eeling device and pulley mechanism is started and the casing deshirring begins. Readings are taken to measure the deshirring force on the force gauge. The most frequently noted instantaneous value of the deshirring force which occurs, as a portion of the stick is deshirred, is defined as the modal deshirr force reading. In general, a modal deshirr force of less than 0.65 pound is preferred and a force less than 0.55 pound is more preferred.

The invention will become clearer when considered together with the following examples which are set forth as being merely illustrative of the invention and which are not intended, in any manner, to be limitative thereof. Unless otherwise indicated, all parts and percentages are by weight.

Example 1

Several coating formulations within the scope of the present invention were prepared, along with comparative formulations identified in Table I as formulas 7 and 8, using "Span 85" and "Mazol 80 MG", respectively, as coating additiv s according to

th procedure described below. "Span 85" is sorbitan tri leate having an HLB of 1.8 available from ICI-Americas, Inc., Wilmington, Delaware. "Mazol 80 MG" is a mixture of ethoxylated monoglycerides having an HLB of 11.0 available from Mazer Chemicals, Inc.

In the coating formulations, CMC 7LF is carboxymethylcellulose, and Methocel E-5 is methyl cellulose, both products being available from The Dow Chemical Company, Midland, Michigan.

The following procedure was followed in preparing the formulations identified in Table I. About one-fourth of the formulation amount of water was heated to between 80°C and 90°C. The methyl cellulose was then added to the heated water with agitation until all particles were thoroughly wetted and a smooth paste was obtained. About another one-fourth of the formulation amount of water at 20°C was added to the mixture and the entire solution was cooled to 20°C while being agitated for about twenty minutes to ensure that the methyl cellulose had completely dissolved and a smooth, clear solution was obtained. The carboxymethylcellulose was then mixed with the remaining portion of water for about five minutes with a dispersator. With a dispersator, there was then mixed in the following order, the coating additive (when employed), mineral oil, propylene glycol, the carboxymethylcellulose solution, and the methyl cellulose solution. The resulting mixture was mixed with the dispersator for about ten minutes. The mixtur was then homogenized using a Gaulin

homogenizer at about 3500 psi for about fifteen minut s and rehomogenized to ensure complete homogenization.

Commercially produced non-fibrous cellulosic casing samples having a flat width measuring about 1.2 inches were internally coated with the prepared coating formulations. These casings were shirred by using an apparatus such as that disclosed in U.S. Patent 2,984,574 to Matecki and U.S. Patent 3,110,058 to Marbach comprising a three-passage mandrel. As each length of casing was shirred, the particular coating formulation from Table I was applied in the amount of about 3.5 mg. of coating composition per square inch of casing internal surface. Coherency values of the coated shirred casing sticks were determined by using the "Coherency Test Method", and the deshirr forces of said coated casings were determined by using the "Deshirring Force Test", both methods described earlier herein. The solution compositions and the stability property thereof, as well as the properties of the shirred casings treated with these solution compositions, are given below in Table I.

The shirred casings were also stuffed with the following frankfurter type medium collagen meat emulsion composition, and linked into frankfurters by conventional linking apparatus for casing peelability evaluations.

Meat Emulsion Composition

Ingredients	Pounds
Beef chuck	44
Beef shank	32
Beef cheek	32
Regular pork trim	92
Salt	4.5
Prague powder	0.5
Spice	2
Water	44

The stuffed casings were all processed in a smokehouse using a processing cycle known to adversely affect the peelability of casing from encased food product. The processing cycle used consisted of a three-minute smoke period followed by a 30-minute period during which time the temperature of the smokehouse was increased from 140°F to 180°F while maintaining the relative humidity at about 25%. The temperature of the smokehouse was maintained at a temperature of about 180°F until the internal temperature of encased food product reached about 160°F, after which time the frankfurters were showered with cold water for about 10 minutes, and then brine chilled for about 10 minutes until their internal temperature was about 41°F.

Peelability characteristics of the various casings of this Example were evaluated on a peeling machine known commercially as an "Apollo Ranger Peeler" which was adjusted to peel at the rate of 2000 pounds of frankfurters p r hour. R sults of the p eling t sts ar s t forth in Tabl I below,

wherein peelability is r ported as weight percent of the food product pe l d (i.e., 0% denotes that none of the casing had been peeled from about the food product encased therein, and 100% represents total peeling and release of the casing from the food product).

Table I

Solution Compositions, Stability, Peelability, Coherency, and Deshirr Force Evaluations

Solution No. and Casing Sample No.	1	2	3	4	5	6	7	8
	%	%	%	%	%	%	%	%
Deionized water	66.28	65.99	64.99	66.23	66.44	65.44	66.28	66.5
Propylene Glycol	28.40	28.11	27.11	28.35	28.56	27.56	28.40	28.5
Mineral Oil	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.0
CMC 7 LF	0.9	0.9	0.9	0.42	---	---	0.9	---
Methocel E-5	0.42	1.0	3.0	1.0	1.0	3.0	---	---
Mazol 80 MG	---	---	---	---	---	---	0.42	---
Span 85	---	---	---	---	---	---	---	1.0
Solution Stability	Stable for more than 72hrs	Stable for more than 72hrs	Stable for more than 72hrs	Stable for more than 72hrs	Stable for more than 72hrs	Stable for more than 72hrs	Stable for 72 hrs only	Stable for more than 72hrs
PEELABILITY (%) OF TREATED CASINGS								
Stick								
A	100	100	100	89.0	21.9	86.4	94.4	37.9
B	95.8	100	100	96.3	46.4	100	100	6.3
C	100	92.4	97.2	100	49.5	95.7	100	9.2
$\bar{X}$ (Average)	98.6	97.5	99.1	95.1	39.3	94.0	98.1	17.8
COHERENCY (Inch-Lbs.) OF SHIRRED STICKS								
After 7 days	2.92	3.02	2.57	2.96	3.11	2.84	2.01	3.18
After 14 days	2.98	2.90	2.58	2.98	2.67	2.81	2.26	3.17
After 28 days	3.01	2.97	2.56	3.00	2.95	2.82	2.08	3.02
DESHIRR FORCE (Lbs.) OF SHIRRED STICKS (Modal*/Maximum)								
After:								
7 days	.35/.53	.31/.61	.33/.58	.29/.58	.28/.44	.37/.61	.33/.59	.29/.52
14 days	.34/.49	.31/.51	.30/.57	.30/.66	.31/.53	.36/.58	.33/.54	.25/.53
28 days	.36/.62	.35/.58	.31/.52	.29/.55	.27/.55	.34/.62	.30/.55	.25/.51

* Modal deshirr force (most frequent reading)

The data in Table I show that the coating compositions of this invention (solution nos. 1 to 4) are as good as, or better than, coating compositions containing emulsion stabilizers such as "Mazol 80 MG" and "Span 85" (solution nos. 7 and 8) in terms of solution stability. This was unexpected because coating composition nos. 1 to 4 do not contain an emulsifier such as either the polyoxyethylene sorbitan ester of higher fatty acids ("Tween 80") described in Chiu et al U.S. Patent 3,898,348 or the "Mazol 80 MG" surfactant described in Higgins et al U.S. serial no. 573,367 filed on January 26, 1984.

It was also found that the shirred casings of this invention (casing sample nos. 1 to 4) had improved coherency values over the casing treated with "Mazol 80 MG" (casing sample no. 7). The modal (most frequent reading) deshirr forces for casing sample nos. 1 to 4 ranging from 0.29 to 0.36 pound (28 days after shirring) were well within the preferred range of less than 0.55 pound.

It was further found that the peelability properties of the casings of this invention are comparable to, or better than, those casings treated with "Mazol 80 MG" as shown by comparing the results for casing sample nos. 1 to 4 with casing sample no. 7.

Likewise, it was found that the deshirr forces of the casings of this invention are comparable to those of comparative formulations 7 and 8.

Example 2

Following the procedure of Example 1, additional coating formulations within the scope of the present invention were prepared having the compositions shown in Table II below.

Commercially prepared non-fibrous cellulose casings were treated with these solution compositions and shirred as described in Example 1. The casings were evaluated for peelability properties as in Example 1. The coherency and deshirr force values were determined by using the "Coherency Test Method" and the "Deshirr Force Test Method" used in Example 1. The shirred stick properties are given in Table II below.

Table II

Solution Compositions, Coherency, and Deshirr Force Evaluations

Solution No. and Casing Sample No.	1	2	3	4	5	6
	%	%	%	%	%	%
Deionized water	66.28	66.28	66.50	66.23	66.44	65.44
Propylene Glycol	28.40	28.40	28.50	28.35	28.56	27.56
Mineral Oil	4.00	4.00	4.00	4.00	4.00	4.00
CMC 7 LF	0.90	0.90	---	---	---	---
Methocel E-5	0.42	---	---	1.00	1.0	3.0
Mazol 80 MG	---	0.42	---	0.42	---	---
Span 85	---	---	1.00	---	---	---
COHERENCY (Inch-Lbs.) OF SHIRRED STICKS						
After:						
1 day	2.7	2.59	2.76	0.81	2.73	2.33
14 days	2.64	2.72	2.82	0.85	2.85	2.52
28 days	2.79	2.64	2.68	0.50	---	2.53

DESHIRR FORCE (Lbs.) OF SHIRRED STICKS (Modal*/Maximum)

After:	1	2	3	4	5	6
1 day	.453/.647	.30/.53	.28/.48	.31/.48	.29/.57	.34/.52
14 days	.42/.65	.46/.55	.36/.53	.25/.55	.31/.53	.38/.69
28 days	.438/.71	.36/.57	.27/.49	.31/.40	----	.34/.57

* Modal deshirr force (most frequent reading)

The data in Table II show that substituting methyl cellulose (solution no. 1) for an equal amount of "Mazol 80 MG" surfactant (solution no. 2) improves the coherency of the shirred casing stick without increasing the deshirr force to an undesirable level. The data also show that combining methyl cellulose and "Mazol 80 MG" in the same easy peel coating composition (solution no. 4) would not be advisable, because this would substantially lower the coherency of the shirred stick as evidenced by casing sample no. 4. The data further show that shirred casings coated with a coating composition which does not contain carboxymethylcellulose and "Mazol 80 MG" but which contains methyl cellulose (casing sample nos. 5 and 6), have improved coherency values over those containing "Mazol 80 MG" (casing sample no. 2).

Example 3

In this example, several types of cellulose ether products having various solution viscosities were evaluated for their suitability in the practice of this invention. The cellulose ether products are available from The Dow Chemical Company, Midland, Michigan under the tradename Methocel©. The Methocel A brand products are methylcellulose made by reacting cellulose with methyl chloride in the presence of caustic soda. The Methocel E, K, 228, 240 and 856 brand products are hydroxypropyl methylcellulose made by reacting cellulose with propylene oxide and methyl chloride in the presence of caustic soda. Th M thoc l HB brand pr ducts are hydroxybutyl methylcellulose made by reacting

cellulose with butylene oxide and methyl chloride in the presence of caustic soda. Further, Methocel 228 has a viscosity of 4,000 cps., Methocel 240 has a viscosity of 40,00[illegible] Methocel 856 has a viscosity of 75,00[illegible] thocel HB has a viscosity of 12,000 [illegible] cel E-5 has a viscosity of 5 cps., Me[illegible] 5 has a viscosity of [illegible] cps., and Methocel [illegible] a viscosity of 4[illegible]. All Methocel solu[illegible] ities are measured with Ubbelohde capill[illegible] at a 2% concentration at 20°C.

Following the procedure of Example 1, co[illegible] mulations within the scope of the present inv[illegible] ere prepared having the compositions shown [illegible] le III below. Commercially prepared non-fi[illegible] ellulose casings were treated with these so[illegible] compositions and shirred as described in Examp[illegible] casings were evaluated for coherency a[illegible] shirr force values by using the "Coherency Test Method" and the "Deshirr Force Test Method" used in Example 1. The properties of the shirred stick samples are given in Table III below.

Table III

Cellulose Ether Solution Compositions, Coherency, and Deshirr Forc Evaluations

Solution No. and Casing Sample No.	1	2	3	4	5	6	7
	%	%	%	%	%	%	%
Deionized water	66.28	66.28	66.28	66.39	66.44	66.44	66.28
Propylene Glycol	28.40	28.40	28.40	28.51	28.56	28.56	28.40
Mineral Oil	4.00	4.00	4.00	4.00	4.00	4.00	4.00
CMC 7 LF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Methocel*	0.42	0.42	0.42	0.20	0.10	0.10	0.42
Solution viscosity (cps)	54	45	95	52	40	47	43

*Solution 1 was made with Methocel K-35.
Solution 2 was made with Methocel A-400.
Solution 3 was made with Methocel 228.
Solution 4 was made with Methocel HB.
Solution 5 was made with Methocel 240.
Solution 6 was made with Methocel 856.
Solution 7 was made with Methocel E-5.

COHERENCY (Inch-Lbs.) OF SHIRRED STICKS							
After:							
10 minutes	1.07	2.03	1.90	1.83	1.87	1.90	1.60
7 days	2.1	2.1	2.25	1.98	2.05	2.18	2.08
14 days	1.92	2.02	2.18	1.92	2.06	2.24	1.89
28 days	2.04	2.06	2.07	1.95	2.09	1.94	1.86

DESHIRR FORCE (Lbs.) OF SHIRRED STICKS (Modal*/Maximum)							
After:							
10 minutes	.373	.357	.343	.363	.397	.350	.300
	.533	.527	.457	.490	.527	.427	.397
7 days	.401	.412	.379	.440	.438	.421	.379
	.612	.630	.589	.531	.567	.570	.580
14 days	.424	.420	.427	.443	.427	.434	.394
	.520	.550	.634	.528	.552	.547	.627
28 days	.379	.418	.410	.393	.436	.386	.393
	.600	.610	.643	.603	.653	.628	.462

* Modal deshirr force (most frequ nt reading)

After preparation, all solution compositions herein were stable for more than 72 hours. The data in Table III shows that all the cellulose ether products provided improved coated casing shirred stick properties over the prior art. In addition, all the cellulose ether product types evaluated provided comparable shirred stick coherencies and shirr forces.

Example 4

This example compares the properties of non-fibrous shirred casing sticks treated with a coating composition containing a polyoxyethylene sorbitan ester of higher fatty acids ("Tween 80") as taught by Chiu et al. in U.S. Patent 3,898,348, or a mixture of ethoxylated monoglycerides ("Mazol 80 MG"), with those of shirred casing sticks treated with a coating composition containing carboxymethylcellulose and methyl cellulose, but not containing "Tween 80" or "Mazol 80 MG". The coating compositions and the properties of the treated casings are shown in Table IV below.

Tabl IV

Coating Solution Compositions

Solution No. and Casing No.	1	2	3
Deionized water	65.86	66.28	66.28
Propylene Glycol	27.99	28.40	28.40
Mineral Oil	4.00	4.00	4.00
CMC 7 LF	0.90	0.90	0.90
Methocel E-5	---	---	0.42
Mazol 80 MG	---	0.42	---
Tween 80	1.25	---	---
CASING STICK PROPERTIES			
Coherency (Inch-lbs.)			
7 days	2.89	4.4	5.1
14 days	2.93	4.63	5.22
44 days	3.04	5.13	5.26
Deshirr Force (lbs.)			
7 days	.28/.58	.30/.61	.38/.60
14 days	.31/.58	.33/.62	.39/.62
44 days	.36/.69	.40/.69	.46/.84

The data in Table IV show that the coherency of the shirred casing of this invention (casing no. 3) is clearly superior to that of the prior art casing treated with "Tween 80" (casing no. 1), and also superior to that of the casing treated with "Mazol 80 MG" (casing no. 2). The modal deshirr force of casing no. 3 which is 0.38 pound, is still within the preferred range of less than 0.55 pound. The casing nos. 1, 2 and 3 have acceptable p elability prop rties.

Pursuant to the foregoing, it has been found that coating compositions containing a water-soluble anionic cellulose ether, a water-soluble nonionic cellulose ether, and a lubricating component, such as mineral oil, are eminently useful for the preparation of shirred cellulosic food casings because they satisfy four important factors. That is, the coating compositions of this invention (1) remain stable for at least seventy-two hours, (2) have the ability to provide food casings with acceptable peeling properties, (3) provide shirred casing having good coherency, without increasing the deshirr forces to an undesirable level, and (4) allow adequate lubrication for casing shirrability and casing stick transfer on a shirring mandrel.

The stability of the coating compositions of this invention is surprising, even though methyl cellulose is expected to induce effective emulsification in two-phase systems, because carboxymethylcellulose is also expected to possess high emulsification and dispersive powers. However, coating compositions such as those of Chiu et al U.S. Patent 3,989,348 containing carboxymethylcellulose were found to separate very rapidly in the absence of an emulsifier such as "Tween 80", "Tween 40", or surfactant 365 (compositions A, D, G, L and O of Example XV, U.S. Patent 3,898,348). Similar coating compositions containing "Mazol 80 MG" as an emulsifier (such as coating composition F shown at Table V, page 25 of U.S. S rial No. 573,367 filed on January 26, 1984)

are also less stabl than those of the present invention. Composition F therein had a 95% phase separation after 72 hours as it did not contain the emulsifier "Mazol 80 MG" or any of the emulsifiers claimed in said patent application.

Although not intended to be bound by a theory for the surprising results found herein, it appears that there is synergism between the water-soluble anionic and nonionic cellulose ethers employed in this invention. For example, shirred casing sample 7 of Example 1 treated with the coating composition containing carboxymethylcellulose, but without methyl cellulose, had a low coherency value of only 2.08 inch-pounds 28 days after shirring, while shirred casing sample 5 of Example 1 treated with the coating composition containing methyl cellulose, but without carboxymethylcellulose, had very poor peelability properties of only about 39%. Likewise, shirred casing sample 4 of Example 2 treated with the coating composition containing methyl cellulose and "Mazol 80 MG" had a very poor coherency of only about 0.50 inch-pounds 28 days after shirring. However, shirred casing sample 2 of Example 1 treated with the coating composition containing both carboxymethylcellulose and methyl cellulose exhibited good peelability of about 97.5%, good coherency of about 2.97 inch-pounds 28 days after shirring, and it had acceptable deshirr forces.

Having described the invention, it is contemplated that modifications thereof may be made and that some features may be employed without

others, all within the spirit and scope of the invention. Howev r, it is not desired to be limited to the illustrative embodiments for obvious modifications will occur to a person skilled in the art.

What is claimed is:

1. A cellulosic food casing having a coating over the internal surface thereof, said coating comprising a mixture of a first component comprising an anionic water-soluble cellulose ether, a second component comprising a nonionic water-soluble cellulose ether, and a third component comprising a lubricant.

2. A cellulosic food casing in accordance with claim 1 wherein said first component is present in an amount of between about 0.01 mg/in^2 and about 0.04 mg/in^2 of said casing internal surface.

3. A cellulosic food casing in accordance with claim 1 wherein said second component is present in an amount of between about 0.007 mg/in^2 and about 0.15 mg/in^2 of said casing internal surface.

4. A cellulosic food casing in accordance with claim 1 wherein said third component is present in an amount of between about 0.035 mg/in^2 and about 0.28 mg/in^2 of said casing internal surface.

5. A cellulosic food casing in accordance with claim 1 wherein said anionic cellulose ether is selected from the group consisting of carboxymethylcellulose and carboxymethyl hydroxyethylcellulose.

6. A c llulosic food casing in accordance with claim 1 wherein said nonionic cellulose ether is selected from the group consisting of methyl

cellulose, hydroxypropyl methylcellulose, hydroxybutyl methylcellulose, hydroxypropylcellulose, ethyl methylcellulose, hydroxyethylcellulose, and ethyl hydroxyethylcellulose.

7. A cellulosic food casing in accordance with claim 1 wherein said anionic water-soluble cellulose ether is carboxymethylcellulose, and said nonionic water-soluble cellulose ether is hydroxypropyl methylcellulose.

8. A cellulosic food casing in accordance with claim 1 wherein said lubricant is selected from the group consisting of mineral oil, vegetable oil, animal oil, silicone oil, acetylated monoglycerides, polyoxyethylene monoesters, sorbitan trioleate, and mixtures thereof.

9. A cellulosic food casing having a coating over the internal surface thereof, said coating comprising a mixture of a first component comprising an anionic water-soluble cellulose ether selected from the group consisting of carboxymethylcellulose and carboxymethyl hydroxyethylcellulose; a second component comprising a nonionic water-soluble cellulose ether selected from the group consisting of methyl cellulose, hydroxypropyl methylcellulose, hydroxybutyl methylcellulose, hydroxypropylcellulose, ethyl methylcellulose, hydroxyethylcellulose, and ethyl hydroxyethylcellulose; and a third component comprising a lubricant selected from th group

consisting of mineral oil, veg table oil, animal oil, silicone oil, acetylated monoglycerides, polyoxyethylene monoesters, sorbitan trioleate, and mixtures thereof.

10. A non-fibrous cellulosic food casing having a coating over the internal surface thereof, said coating comprising a mixture of a first component comprising an anionic water-soluble cellulose ether, a second component comprising a nonionic water-soluble cellulose ether, and a third component comprising a lubricant.

11. A non-fibrous cellulosic food casing in accordance with claim 10 wherein said first component is present in an amount of between about 0.01 mg/in^2 and about 0.04 mg/in^2 of said casing internal surface.

12. A non-fibrous cellulosic food casing in accordance with claim 10 wherein said second component is present in an amount of between about 0.007 mg/in^2 and about 0.15 mg/in^2 of said casing internal surface.

13. A non-fibrous cellulosic food casing in accordance with claim 10 wherein said third component is present in an amount of between about 0.035 mg/in^2 and about 0.28 mg/in^2 of said casing internal surface.

14. A non-fibrous cellulosic food casing in accordance with claim 10 wherein said anionic cellulose ether is selected from the group consisting of carboxym thylcellulose and carboxymethyl hydroxyethylcellulose.

15. A non-fibrous cellulosic food casing in accordance with claim 10 wherein said nonionic cellulose ether is selected from the group consisting of methyl cellulose, hydroxypropyl methylcellulose, hydroxybutyl methylcellulose, hydroxypropylcellulose, ethyl methylcellulose, hydroxyethylcellulose, and ethyl hydroxyethylcellulose.

16. A non-fibrous cellulosic food casing in accordance with claim 10 wherein said anionic water-soluble cellulose ether is carboxymethylcellulose, and said nonionic water-soluble cellulose ether is hydroxypropyl methylcellulose.

17. A non-fibrous cellulosic food casing in accordance with claim 10 wherein said lubricant is selected from the group consisting of mineral oil, vegetable oil, animal oil, silicone oil, acetylated monoglycerides, polyoxyethylene monoesters, sorbitan trioleate, and mixtures thereof.

18. A non-fibrous cellulosic food casing having a coating over the internal surface thereof, said coating comprising a mixture of a first component comprising an anionic water-soluble cellulose ether selected from the group consisting of carboxymethylcellulose and carboxymethyl hydroxyethylcellulose; a second component comprising a nonionic water-soluble cellulose ether selected from the group consisting of methyl cellulose, hydroxypropyl m thylcellulos , hydroxybutyl

methylc llulose, hydroxypropylcellulose, ethyl methylcellulose, hydroxyethylcellulose, and ethyl hydroxyethylcellulose; and a third component comprising a lubricant selected from the group consisting of mineral oil, vegetable oil, animal oil, silicone oil, acetylated monoglycerides, polyoxyethylene monoesters, sorbitan trioleate, and mixtures thereof.

19. A shirred, tubular, cellulosic food casing having a coating over the internal surface thereof, said coating comprising a mixture of a first component comprising an anionic water-soluble cellulose ether, a second component comprising a nonionic water-soluble cellulose ether, and a third component comprising a lubricant.

20. A shirred, tubular, cellulosic food casing in accordance with claim 19 wherein said first component is present in an amount of between about 0.01 mg/in^2 and about 0.04 mg/in^2 of said casing internal surface.

21. A shirred, tubular, cellulosic food casing in accordance with claim 19 wherein said second component is present in an amount of between about 0.007 mg/in^2 and about 0.15 mg/in^2 of said casing internal surface.

22. A shirred, tubular, cellulosic food casing in accordance with claim 19 wherein said third component is present in an amount of between about 0.035 mg/in^2 and about 0.28 mg/in^2 of said casing int rnal surface.

23. A shirred, tubular, c llulosic food casing in accordance with claim 19 wherein said anionic water-soluble cellulose ether is selected from the group consisting of carboxymethylcellulose and carboxymethyl hydroxyethylcellulose.

24. A shirred, tubular, cellulosic food casing in accordance with claim 19 wherein said nonionic cel[illegible] ether is selected from the group consisting o[illegible]llulose, hydroxypropyl [illegible]ethylcellulos[illegible]butyl methylcellulose, [illegible]droxypropylcelli[illegible]hyl methylcellulose, [illegible]oxyethylcellulose, and ethyl [illegible]oxyethylcellulose.

25. A shirred, tubular, cellulosic food [illegible]g in accordance with claim 19 wherein said lubricant is selected from the group consisting of mineral oil, vegetable oil, animal oil, silicone oil, acetylated monoglycerides, polyoxyethylene monoesters, sorbitan trioleate, and mixtures thereof.

26. A shirred, tubular, non-fibrous cellulosic food casing having a coating over the internal surface thereof, said coating comprising a mixture of a first component comprising an anionic water-soluble cellulose ether, a second component comprising a nonionic water-soluble cellulose ether, and a third component comprising a lubricant.

27. A shirred, tubular, non-fibrous cellulosic food casing in accordance with claim 26 wherein said first component is present in an amount of between about 0.01 mg/in^2 and about 0.04 mg/in^2 of said casing internal surface.

28. A shirred, tubular, non-fibrous c llulosic food casing in accordance with claim 26 wherein said second component is present in an amount of between about 0.007 mg/in^2 and about 0.15 mg/in^2 of said casing internal surface.

29. A shirred, tubular, non-fibrous cellulosic food casing in accordance with claim 26 wherein said third component is present in an amount of between about 0.035 mg/in^2 and about 0.28 mg/in^2 of said casing internal surface.

30. A shirred, tubular, non-fibrous cellulosic food casing in accordance with claim 26 wherein said anionic water-soluble cellulose ether is selected from the group consisting of carboxymethylcellulose and carboxymethyl hydroxyethylcellulose.

31 A shirred, tubular, non-fibrous cellulosic food casing in accordance with claim 26 wherein said nonionic cellulose ether is selected from the group consisting of methyl cellulose, hydroxypropyl methylcellulose, hydroxybutyl methylcellulose, hydroxypropylcellulose, ethyl methylcellulose, hydroxyethylcellulose, and ethyl hydroxyethylcellulose.

32. A shirred, tubular, non-fibrous cellulosic food casing in accordance with claim 26 wherein said lubricant is selected from the group consisting of mineral oil, vegetable oil, animal il, silicone oil, acetylated monoglycerid s, polyoxyethylene monoesters, sorbitan trioleate, and mixtures ther of.

33. A shirred, tubular, non-fibrous cellulosic food casing in accordance with claim 26 wherein said food casing has a water content of between about 12.0 weight percent and about 40.0 weight percent, based upon the weight of dry cellulose in said casing.

34. A method for preparing a cellulosic casing which is easily peelable from food s encased and processed therein which s applying to the internal surface of said c food casing a coating composition a mixture of a first component comprising -soluble cellulose ether, a second comp sing a nonionic water-soluble cellulose ether, and a third component comprising a lubricant.

35. A method for preparing a cellulosic food casing in accordance with claim 34 wherein said first component is present in an amount of between about 0.01 mg/in^2 and about 0.04 mg/in^2 of said casing internal surface.

36. A method for preparing a cellulosic food casing in accordance with claim 34 wherein said second component is present in an amount of between about 0.007 mg/in^2 and about 0.15 mg/in^2 of said casing internal surface.

37. A method for preparing a cellulosic food casing in accordance with claim 34 wherein said third component is present in an amount of betwe n about 0.035 mg/in^2 and about 0.28 mg/in^2 of said casing internal surface.

38. A method for pr paring a cellulosic food casing in accordance with claim 34 wherein said anionic cellulose ether is selected from the group consisting of carboxymethylcellulose and carboxymethyl hydroxyethylcellulose.

39. A method for preparing a cellulosic food casing in accordance with claim 34 wherein said nonionic cellulose ether is selected from the group consisting of methyl cellulose, hydroxypropyl methylcellulose, hydroxybutyl methylcellulose, hydroxypropylcellulose, ethyl methylcellulose, hydroxyethylcellulose, and ethyl hydroxyethylcellulose.

40. A method for preparing a cellulosic food casing in accordance with claim 34 wherein said lubricant is selected from the group consisting of mineral oil, vegetable oil, animal oil, silicone oil, acetylated monoglycerides, polyoxyethylene monoesters, sorbitan trioleate, and mixtures thereof.

41. A method for preparing a non-fibrous cellulosic food casing which is easily peelable from food products encased and processed therein which comprises applying to the internal surface of said cellulosic food casing a coating composition comprising a mixture of a first component comprising an anionic water-soluble cellulose ether, a second component comprising a nonionic water-soluble cellulose ether, and a third component comprising a lubricant.

42. A method for preparing a non-fibrous cellulosic food casing in accordance with claim 41 wherein said first component is present in an amount of between about 0.01 mg/in^2 and about 0.04 mg/in^2 of said casing internal surface.

43. A method for preparing a non-fibrous cellulosic food casing in accordance with claim 41 wherein said second component is present in an amount of between about 0.007 mg/in^2 and about 0.15 mg/in^2 of said casing internal surface.

44. A method for preparing a non-fibrous cellulosic food casing in accordance with claim 41 wherein said third component is present in an amount of between about 0.035 mg/in^2 and about 0.28 mg/in^2 of said casing internal surface.

45. A method for preparing a non-fibrous cellulosic food casing in accordance with claim 41 wherein said anionic cellulose ether is selected from the group consisting of carboxymethylcellulose and carboxymethyl hydroxyethylcellulose.

46. A method for preparing a non-fibrous food casing in accordance with claim 41 wherein said nonionic cellulose ether is selected from the group consisting of methyl cellulose, hydroxypropyl methylcellulose, hydroxybutyl methylcellulose, hydroxypropylcellulose, ethyl methylcellulose, hydroxyethylcellulose, and ethyl hydroxyethycellulose.

47. A method for preparing a non-fibrous cellulosic food casing in accordance with claim 41 wherein said lubricant is selected from the group consisting of mineral oil, vegetable oil, animal oil, silicone oil, acetylated monoglycerides, polyoxyethylene monoesters, sorbitan trioleate, and mixtures thereof.

48. A method for preparing a non-fibrous cellulose food casing in accordance with claim 41 including adding to said casing between about 12.0 weight percent and about 40.0 weight percent of water, based upon the weight of dry cellulose in said casing.

49. A method for preparing a processed food product comprising stuffing a food emulsion into a tubular cellulosic casing having a coating over the internal surface thereof, said coating comprising a mixture of a first component comprising an anionic water-soluble cellulose ether, a second component comprising a nonionic water-soluble cellulose ether, and a third component comprising a lubricant, and processing the food product.

50. A method for preparing a processed food product in accordance with claim 49 wherein said first component is present in an amount of between about 0.01 mg/in^2 and about 0.04 mg/in^2 of said casing internal surface.

51. A method for preparing a processed food product in accordance with claim 49 wherein said second component is pres nt in an amount of between about 0.007 mg/in^2 and about 0.15 mg/in^2 of said casing internal surface.

52. A method for preparing a processed food product in accordance with claim 49 wherein said third component is present in an amount of between about 0.035 mg/in^2 and about 0.28 mg/in^2 of said casing internal surface.

53. A method for preparing a processed food product in accordance with claim 49 wherein said anionic cellulose ether is selected from the group consisting of carboxymethylcellulose and carboxymethyl hydroxyethylcellulose.

54. A method for preparing a processed food product in accordance with claim 49 wherein said nonionic cellulose ether is selected from the group consisting of methyl cellulose, hydroxypropyl methylcellulose, hydroxybutyl methylcellulose, hydroxypropylcellulose, ethyl methylcellulose, hydroxyethylcellulose, and ethyl hydroxyethylcellulose.

55. A method for preparing a processed food product in accordance with claim 49 wherein said lubricant is selected from the group consisting of mineral oil, vegetable oil, animal oil, silicone oil, acetylated monoglycerides, polyoxyethylene monoesters, sorbitan trioleate, and mixtures thereof.

56. A method for preparing a processed food product comprising stuffing a food emulsion into a tubular non-fibrous cellulosic casing having a coating over the internal surface thereof, said casing comprising a mixture of a first component comprising an ani nic water-soluble cellulose ether,

a second component comprising a nonionic wat r-soluble cellulose ether, and a third component comprising a lubricant, and processing the food product.

57. A method for preparing a processed food product in accordance with claim 56 wherein said first component is present in an amount of between about 0.01 mg/in^2 and about 0.04 mg/in^2 of said casing internal surface.

58. A method for preparing a processed food product in accordance with claim 56 wherein said second component is present in an amount of between about 0.007 mg/in^2 and about 0.15 mg/in^2 of said casing internal surface.

59. A method for preparing a processed food product in accordance with claim 56 wherein said third component is present in an amount of between about 0.035 mg/in^2 and about 0.28 mg/in^2 of said casing internal surface.

60. A method for preparing a processed food product in accordance with claim 56 wherein said anionic cellulose ether is selected from the group consisting of carboxymethylcellulose and carboxymethyl hydroxyethylcellulose.

61. A method for preparing a processed food product in accordance with claim 56 wherein said nonionic cellulose ether is selected from the group consisting of methyl cellulose, hydroxypropyl methylcellulose, hydroxybutyl methylcellulose, hydroxypropylcellulose, thyl methylcellulose, hydroxyethylc llulos , and ethyl hydroxyethylcellulose.

62. A method for preparing a processed food product in accordance with claim 56 wherein said lubricant is selected from the group consisting of mineral oil, vegetable oil, animal oil, silicone oil, acetylated monoglycerides, polyoxyethylene monoesters, sorbitan trioleate, and mixtures thereof.

63. A method for preparing a processed food product in accordance with claim 56 wherein said food casing has a water content of between about 12.0 weight percent and about 40.0 weight percent, based upon the weight of dry cellulose in said casing.

64. A coating composition useful for treating the internal surface of food casings, said coating composition comprising a mixture of a first component comprising an anionic water-soluble cellulose ether, and a second component comprising a nonionic water-soluble cellulose ether.

65. A coating composition in accordance with claim 64 including a lubricant.

66. A coating composition in accordance with claim 65 wherein said lubricant is selected from the group consisting of mineral oil, vegetable oil, animal oil, silicone oil, acetylated monoglycerides, polyoxyethylene monoesters, sorbitan trioleate, and mixtures thereof.

67. A coating composition in accordance with claim 64 wherein said anionic cellulose ether is selected from the group consisting of carboxymethylcellulose and carboxymethyl hydroxyethylcellulose.

68. A coating composition in accordance with claim 64 wherein said nonionic cellulose ether is selected from the group consisting of methyl cellulose, hydroxypropyl methylcellulose, hydroxybutyl methylcellulose, hydroxypropylcellulose, ethyl methylcellulose, hydroxyethylcellulose, and ethyl hydroxyethylcellulose.

69. A coating composition in accordance with claim 64 including a polyol having from 3-6 carbon atoms and at least 2 hydroxyl groups.

70. A coating composition in accordance with claim 69 wherein said polyol is selected from the group consisting of propylene glycol, triethylene glycol, glycerol, and sorbitol.

71. A coating composition in accordance with claim 64 wherein said food casings comprise cellulosic food casings.

72. A coating composition in accordance with claim 71 wherein said cellulosic food casings are non-fibrous food casings.

73. A coating composition in accordance with claim 64 comprising a solution containing at least about 0.3 percent by weight of said anionic water-soluble cellulose ether, and at least about 0.2 percent by weight of said nonionic water-soluble cellulose ether, based on the weight of said coating composition.

74. A coating composition in accordance with claim 73 including at least about 1 percent by weight of a lubricant, based on the weight of said coating composition.